Dowling, Emily

From: Bessell, Travis
Sent: Wednesday, 5 November, 2014 12:02 p.m.
To: 47F
Cc: Merrett, David
Subject: RE: Channel Markers and mask in general [SEC=UNCLASSIFIED]

UNCLASSIFIED

Hi 47F

The mask is still a work in progress. I spoke to Andrew last week and he was working on it.
For the time being I have removed the stationary tracks from the display.

I'll keep you informed when the mask has been implemented.

Cheers,
Travis

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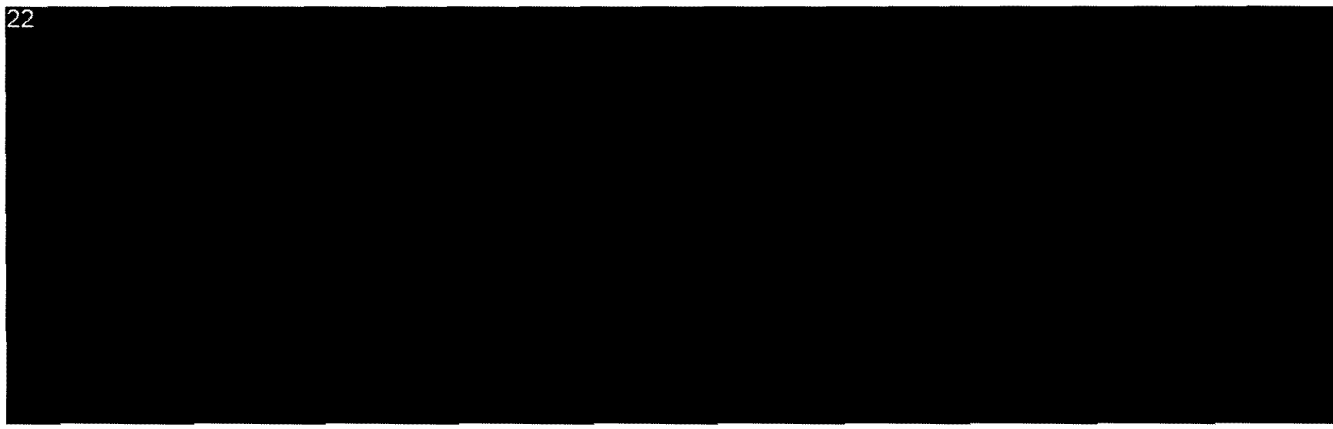
22



2

Dowling, Emily

From: Bessell, Travis
Sent: Thursday, 16 October, 2014 5:26 p.m.
To: 47F
Cc: 47F Hennessy, Brendan; Merrett, David
Subject: RE: CKI capability statement [SEC=UNCLASSIFIED]

UNCLASSIFIED

Hi 47F

The traffic lights are split into two categories, link state and radar state.

The link state is determined from a heartbeat that is sent from each sensor site every 5 minutes and indicates the current state of the connection between the sensor site and kennel. Due to not being able to use ping, this is an alternative that seems to work well. The heartbeat is a very small file and the contents of the file is the speed that the data was sent on the previous sensor update. Therefore, if the heartbeat is received and the file speed is above 1kB/s, the light will be green indicating a suitable connection. The light will change to amber if the speed drops below 1kB/s indicating a limited connection. The light will change to red if a heartbeat has not been received in the last 10 minutes indicating an issue with the link/internet.

The radar state will only display a light if the link state is present. If the link state has failed (red) there is no way to tell if the radar is still operating so no lights will be displayed for the radar state. If a link is present and the radar updates are being received on the watchdog server the light will be green. If a link is present and there have been no radar updates for 15 minutes the light will change to red indicating an issue with the radar that may need to be investigated.

So in short,

Link state:
Green = link established, >1kB/s
Amber = link established, <1kB/s
Red = No link established (possible internet failure)

Radar state:
Green = radar updating correctly
Red = radar not updating (possible radar failure)
No lights = No link established

Please let me know if anything is not clear.

Cheers,
Travis

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From: Merrett, David
Sent: Thursday, 16 October, 2014 9:13 a.m.
To: Bessell, Travis; Hennessy, Brendan
Cc: 47F
Subject: RE: CKI capability statement [SEC=UNCLASSIFIED]

UNCLASSIFIED

Brendan / Travis,
Can you please answer 47F question?

47F Tight network security means a simple ping test is not allowed, so the link health is established by other means. I'll let Brendan / Travis elaborate in both tech and lay terms.
Dave M.

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22 [redacted]

Dowling, Emily

From: Bessell, Travis
Sent: Tuesday, 28 October, 2014 3:27 p.m.
To: 47F
Cc: Shaw, Andrew; Hennessy, Brendan; Merrett, David
Subject: RE: CKI radar [SEC=UNCLASSIFIED]

UNCLASSIFIED

Hi 47F

After looking at the system over the last couple of weeks I think it would be more beneficial to mask out the channel markers as well as the land. I understand that a blank screen to an operator may cause them to think that the system isn't working properly but over time the operators should build confidence in the system and this should not be an issue. But if you think it will be, then can I suggest we leave north keeling unmasked?

I believe the channel markers are having a negative impact on the tracker when trying to track legitimate targets within the lagoon. Quite often we have witnessed tracks being seduced by the bright overpowering detections from the markers especially the ferry as it seems to travel very close to them during its trip back and forth. The added bonus of masking out the channel markers is that the amount of data we transfer will be greatly reduced.

Cheers,
Travis

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22

47F [redacted]

No,

The mask hasn't changed. I did say a week or so ago that we were going to turn off the reporting of 'stationary' tracks, (after turning it ON in early Oct for diag purposes), however we left them on, because it didn't seem to be affecting the link bandwidth or anything.

Jus theard you spoke to Trav, so will let you sort it out with him.

David Merrett
Radar Systems Engineer,
DSTO.
08 73895622

Dave

22 [redacted]

Serial 4

Dowling, Emily

From: Merrett, David
Sent: Monday, 2 December, 2013 10:39 a.m.
To: 47F
Cc: Shaw, Andrew
Subject: Cocos radar HW. [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

47F
I put this together based on essential elements of existing (CI) Kelvin Hughes System.
For accurate system weights, remember radar mast cables are ~4.4 kg/m. (eg 132kg for 30 M)

	Height (RU)	*Depth*	*Weight kg*	*Power W*	
KH Drv Ctrl Unit (DCU)	4.55	450	13	600	pwr depends on wind level. 2kW peak
UPS + Battery	4	600	69	50	pwr is estimate only.
PC	5	525	31	250	
KVM	1	590	17	40	
ROUTER	1	200	4	20	
Power Dist.	1	300	5	10	Re use 8-outlet Raritan from Xmas Is?
Other - shelving?	2	500	5		Documentation / tools / draw /
Other - Future options	2	500	5	10	AIS? Weather? Plugpacks? Envir or S
TOTALS	**21**		**149**	**980**	
	933.45	mm			
KH DTX-A1-ADDA + LPA-A3 Ant	n/a		177		Up mast unit power from DCU

I'll look at mpp file later today.

Regards,
David Merrett.

22 [redacted]

22

[redacted]

Serial 5

Dowling, Emily

From: Merrett, David
Sent: Wednesday, 20 August, 2014 4:03 p.m.
To: 47F [redacted]
Subject: new site [DLM=For-Official-Use-Only]

Categories: No Security Classification Required

For-Official-Use-Only

Hi 47F [redacted]
We've just turned on a 'new' version of user interface for testing. Its currently running in parallel with existing pages, using essentially the same live data. AIS is still to be added. Biggest changes are behind the scenes, where We

- parameterised most of the HMI presentation , to make future adaptations easier
- separated the radar tracker from the transfer process and HMI
- improved flexibility to add new sites or site-sensors.

Take a look, and if you see anything major you don't like , let us know. (Keeping in mind its still in the 'tweaking' stage).

33 [redacted]

David Merrett
Radar Systems Engineer,
DSTO.
08 73895622

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Serial 6

Dowling, Emily

From: Merrett, David
Sent: Monday, 30 June, 2014 2:27 p.m.
To: 47F [redacted]
Subject: RE: 2378 Air Conditioning Layout [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

47F [redacted]

- Im talking NW settings over with Brendan and Trav this week, but I expect it will be similar to 22 [redacted] Is getting that info by COB this week ok? (Id assumed it was simple SW config, so could wait a few weeks).
- At one stage you requested I hold off on purchasing router, and that there was a possibility youd be able to supply one. Is that still the case? (Ive always assumed you are providing firewall – but wasn't sure about router – maybe its part of the Satcomm-unit HW?)

Regards,
Dave m

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22 [redacted]

Serial 7

Dowling, Emily

From: Merrett, David
Sent: Monday, 18 August, 2014 1:18 p.m.
To: 47F [redacted]
Subject: RE: AIS [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

Its SLR-200N (Similar to SLR-200NG on CI).
See http://www.comarsystems.com/slr_200n_and_200ng.html
The following will help understand how connectivity youd like can be achieved:

- The SLR-200N uses TCP/IP to connect only 1-to-1 to a client. Currently (CKI 22 [redacted] DSTO-written software on the local Linux PC is receiver of the data.
- The software is called "ais_rptr" and it is really just a one-to-many repeater of the AIVDM packets. We can specify multiple clients to connect to / receive-from it as we choose.

Dave M.

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22 [redacted]

22

Dowling, Emily

From: Merrett, David
Sent: Monday, 21 July, 2014 4:02 p.m.
To: 47F [redacted]
Cc: Haywood, Brett
Subject: RE: Budget [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

Hi Simon,
Ive got some better cost estimates for the additional hardware purchase required. Could you please review and accept (or otherwise) the proposal that DSTO purchase these hardware items and invoice ACBPS for the funds up to amount given below?

QTY 1 Rack mounted LCD display / Keyboard $1451
QTY 1 BIOS-level-access interface + PC interface modules (for above) $1499
QTY 1 Shipping $50
Total : $3000. (ex gst).

Thanks,

David Merrett
Radar Systems Engineer,
DSTO.
08 73895622

22 [redacted]

47F, 22 [redacted]

From: Merrett, David<mailto:David.Merrett@dsto.defence.gov.au>
Sent: 18/07/2014 12:27
To 47F [redacted]
Subject: Budget [SEC=UNCLASSIFIED]

UNCLASSIFIED

Hi 47F [redacted]
I have a few more hardware items to buy (mostly ADSB rx , KVM and connectors), so given we are also planning on funding A. Shaws travel (TBC says $4356) , Im hitting a budget shortfall of around $2K. Im going to ask our OPSTSR folk here for the funds, but in case they are hard to convince, would it be difficult for ACBPS to provide the additional funding ? It doesn't really matter whether its travel or hardware (DSTO would invoice ACBPS for expended amount - I got the impression youd rather spend on hardware than more travel).
An alternative possibility is CBO could purchase the KVM equip (~ $3k if we are to allow for BIOS-level screen access, otherwise ~$2k) as long as it was done promptly and delivered directly here.

Anyway , let me know what you think,
Regards,
Dave M.

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22 [redacted]

Dowling, Emily

From: Merrett, David
Sent: Monday, 24 March, 2014 1:11 p.m.
To: 47F
Subject: RE: 22 and CKI [SEC=UNCLASSIFIED]

Categories: UNCLASSIFIED

UNCLASSIFIED

Sorry - yeah - Old Crow Arrived with the AIS RX.

22

[redacted]

From: Merrett, David [mailto:David.Merrett@dsto.defence.gov.au]
Sent: Monday, 24 March 2014 11:42 AM
To: 47F
Subject: RE: 22 and CKI [SEC=UNCLASSIFIED]

UNCLASSIFIED

Hi,
I Suspect rain sensor is still broken, just producing amplified output.
Alarm triggers (I assume youre talking about the GIF display?) would be set by the wndows software.

Im a bit confused about mention of OS being possibly windows 7.
Assuming we're still talking about CKI design, my original understanding is that there is no functional requirement for anything other than a single Linux-based PC.
Adding a low-end 1RU windows 7 PC wouldnt be a huge issue, but it might be worth looking at the functional needs first to ensure they cant be covered in cleverer ways

(Is this from a sole need to internally access switch / firewall? If so, perhaps there is equiv linux SW avail. ?)

Dave

22

[redacted]

22

Dowling, Emily

From: Merrett, David
Sent: Thursday, 7 August, 2014 2:49 p.m.
To: 47F
Subject: RE: CKI radar [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

47F

At first glance, I have no objections to this. Its certainly possible to do for an added $12k + 3 months. A few points:

- We have 'next-day' call out warranty for 3 years on all these PCs. We actually used this yesterday after the cooling system on your 'spare' PC (here at DSTO) had problems.
- The layout of the Rack may get 'tight' , more so from a cabling perspective. I purposely left space above display so it could potentially be used open / used without needed to completely extend display-drawer. This is sacrificable of course, but would limit the ability to access the rear / sides of other rack units.
- A built-in spare basically buys you back the typ 48 hours it would otherwise take to fly in the spare. I guess the risk analysis would include something like
    - Overall likelihood of undesirable event = (Chance of PC failure) x (chance of use needed within 48 hours) x (chance of alt-sensor not being avail.)
    - Other options like have spare sitting on-island, with a clear instruction booklet on swap-out
- My gut feel on this idea is that to save on immediate work, and reduce risk, we build CKI sys as "fit-for-but-not-with", and retro fit spare later pending any system design-adjustment / planning that adding a spare might require.
- Another consideration: Although we have here at DSTO 1 spare of the PC + capture (digitiser) -card in question, with this being an old design,
    - a smarter HW option is currently available which of course is smaller and better.
    - Purchasing of this HW baseline is likely to become impossible in the near future. (EG the '90s PCI digitiser interface standard has all- but disappeared in modern PCs).

Hope that helps.

David Merrett
Radar Systems Engineer,
DSTO.
08 73895622

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22

22

[redacted]

Serial 11

Dowling, Emily

From: Merrett, David
Sent: Tuesday, 25 March, 2014 1:16 p.m.
To: 47F
Subject: RE: CKI radar intentions [SEC=UNCLASSIFIED]
Attachments: blockDiag1.doc

Categories: UNCLASSIFIED

UNCLASSIFIED

47F
Assuming that any effort in developing locally-accessible (EG on site by customs / SAR user) information feeds is less important than the primary goal of getting the system feed to Canberra,
then the simplest solution is to stream AIVDM direct to user server (in Canberra). My current preference however is to feed it from the receiver to local (CKI) linux system (22) , then on to where ever, because it simplifies networking, and the flexibility of distribution options (eg can do send to both local and remote AIVDM software process).

My plan/design is to replicate the HMI software functions(with some adjustments in the final delivered implementation) 22
Attached document describes this more.

The default design (EG as would be tested at DSTO) is likely to be the 22 baseline, with testing here to include development and hopefully deployment of a 'smarter' architecture.
Part of this development will be dictated by the intent (or absence of) an AMIFC con-ops. One conceivable evolution of the whole thing (multiple sites) from a user perspective , is a single operator able to interact with a single web-site that presents user info from any sensor (CKI 22 xxxx etc as/if it grows). This is all HMI stuff
I realise this is opposite to a 'stove-piped' threat-based design , which would have completely seperate hardware and software for each sensor/site, so please let me know if my 'anti-stove-pipe' philosophy is going in the wrong direction for some reason.

Ive asked Brendan to examine the Google map license conditions. I believe that since any CKI page will be part of the same Domain / URL 22 the same licesne will cover any pages served from the server.

Dave

22

22

[redacted]

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FOI 003/15/16

CKI System discussion Document. David Merrett. 25/3/14

The CKI radar system primarily comprises 2 conceptually separate functions:

- remote-sensing :collect radar track and & environment data
- User presentation ; present above data to user.

Lessons learnt from the 22 [redacted] point to a CKI solution with a similar set of functions to implement the various sub-system requirements, with the biggest differences being mostly *which* sub-system implements which function.

As an example, it makes more sense that the tracker function output track data, rather than the final user picture and it's distribution service (22 [redacted]).

More logical positioning of the functions across the system software *potentially* allows other efficiencies, and capabilities, such as simultaneous presentation and interaction with any number of similar remote systems from a single web site.

Below are

1a. Draft table of software items at CKI

1b. Draft table of software items at its webserver.

2. Draft Block diagram of CKI hardware subsystems.

AIS may be distributed to web server directly from the receiver , however this requires more networking setup, (firewall config) , and prevents immediate access to the AIS data at CKI .

Table 1 Draft CKI Software

CKI	
LINUX Work station	
Software Item	***Products***
Capture	Raw Video files
Detector	Raw Detection Files
Tracker	-Track matrix every N minutes -Track video cubes
Weather	Record / assemble weather data
AIS	Record / assemble AIVDM (tentative?)
Data transfer	Assemble payload of above data and transfer to web server(s)
AIS Receiver	AIVDM packets direct to web server. (tentative?)

Table 2 Draft Server Sotware

Mainland Watchdog Server	
Software Item	***Function***
Apache2 web server	Serves ALL CKI / CI Web pages
	Map.htm, map2.htm, map_tech.htm, map_ais.htm, RadarWeather.htm etc
Receiver / Archive	Validates and archives payloads from sensor(s)
Production1	Extract & Assemble Track lines / movies , sys.info.
Production2 (tentative?)	Final web information assembly format / present

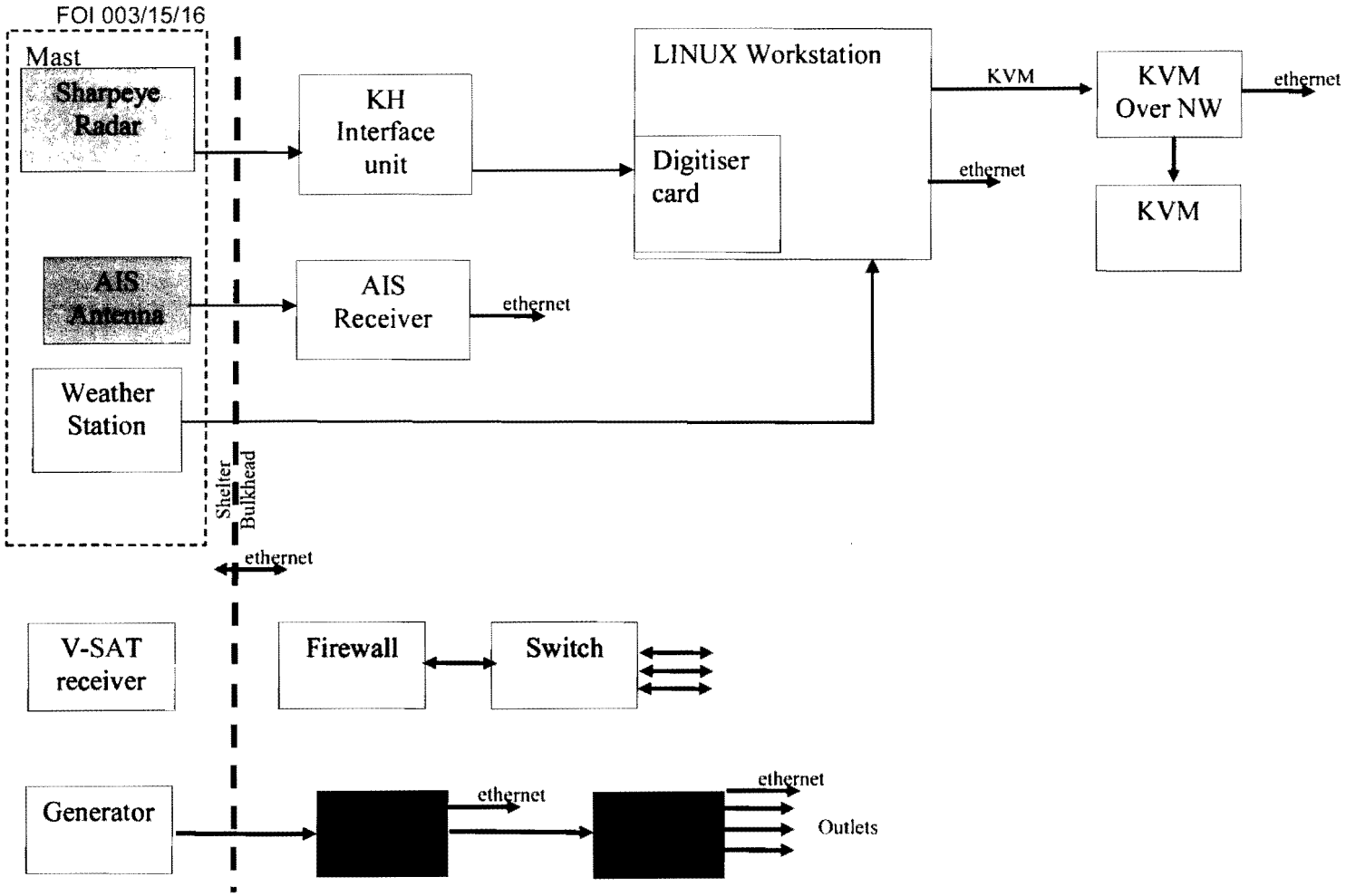

Figure 1 Draft CKI Hardware block diagram

Dowling, Emily

Serial 13

From: Merrett, David
Sent: Wednesday, 9 April, 2014 11:41 a.m.
To: 47F
Subject: RE: CKI site [SEC=UNCLASSIFIED]
Attachments: IMAG0900.jpg

Categories: UNCLASSIFIED

UNCLASSIFIED

47F
Although I have double checked precise locations against your image, My smart-ph vid / photos indicate that those labelled "have been removed" were **definitely present** at the time of our visit.
Hieght-wise south to north:Med low high
I can collate and sent more pics / details if needed.
Dave.

22 [redacted]

22

Dowling, Emily

From: Merrett, David
Sent: Friday, 15 August, 2014 10:52 a.m.
To: 47F
Subject: RE: Cocos Island power extension [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

Is it too late to run a CAT 5 cable?

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22 [redacted]

22 [redacted]

Dowling, Emily

Serial 16

From: Merrett, David
Sent: Monday, 26 May, 2014 10:07 a.m.
To: 47F
Subject: RE: Cocos site [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

47F
Agree on all points. Ive looked at the map and pictures, and I don't see any other major issues. Given the healthier state of the existing pads, and good distance from the other antenna infrastructure, it seems the best and lowest risk position.
Does the NDB still operate? I did some checking and confirmed our TX shouldn't be a concern for this if it does.
Regards,

David Merrett
Radar Systems Engineer,
DSTO.
08 73895622

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[redacted]

Dowling, Emily

From: Merrett, David
Sent: Thursday, 17 April, 2014 11:14 a.m.
To: 47F
Subject: RE: Enclosure height? [SEC=UNCLASSIFIED]

Categories: UNCLASSIFIED

UNCLASSIFIED

I think so.
I checked....Lead time for Raritan products is about 3 weeks.
Happy Easter.
Dave

22

From: Merrett, David [mailto:David.Merrett@dsto.defence.gov.au]
Sent: Thursday, 17 April 2014 10:58 AM
To: 47F
Subject: Enclosure height? [SEC=UNCLASSIFIED]

UNCLASSIFIED

47F
Im about to buy a Raritan side-mount PDU which is 1044mm high. Looking at the CBO tender response, this might be getting close to the upper limit of the enclosure height (design details of which are still TBD)... Do you think a 1.1m high enclosure is easily acheivable? (there are less-attractive alternative models if not).
Possible factors:
- Does Sat-dish need to mount on top?
- Stowed-mast : height of lowest horizontal section?

Thanks for any comments,
Dave M.

22

Dowling, Emily

From: Merrett, David
Sent: Tuesday, 3 June, 2014 4:28 p.m.
To: 47F
Subject: RE: KH radar [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

Im assuming its just the 'up mast' bits youre thinking of.
Currently they are in 2 separate boxes (antenna and transceiver), and it would be easiest to assume they will leave here as shipped by KH.
When we moved the transceiver 22 we simply mounted it onto an open pallet. This , or mounting (temporarily) onto sled is an alternative to the KH shipping (sealed wooden box, with top entry).
Ill get the dimensions of the KH boxes and let you know asap.
Dave

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22

22

Serial 19

Dowling, Emily

From: Merrett, David
Sent: Tuesday, 3 June, 2014 5:02 p.m.
To: 47F [redacted]
Subject: RE: KH radar [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

Antenna box is 398cm x 73cm x 45cm (measured by Matt and me) Other heavy box has written on it 106cm x 63cm x 92cm. It measures slightly less but unless you need better than 1cm accuracy that is good enough.

Im not sure about gross weights, but you can probably add at least 10% of the contents weight (ref KH manual / dwgs).

Dave

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22 [redacted]

22

Dowling, Emily

Serial 20

From: Merrett, David
Sent: Tuesday, 21 January, 2014 1:22 p.m.
To: 47F
Subject: RE: KH sharpeye [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

47F ref. also comments in table below.

1. Cables:
- Tower Cable lengths depend on tower height + run-to-cabinet/shelter (tot 35M? 37M?), and length, should all be the same for the 3 cables
(single phase, 3 ph and composite-signal.)
Suggest you confirm CKT-A6-30 is the kit for 2 power cables.
- I noted a discrepancy in cable part numbers between the table listed below and 22 KH Doc "KH-5146" (page 7) , which has 14-core composite cable as 45-762-0116-001
and 2-core mains cable as 45-762-0173-001. So confirming all part numbers would be wise.

2. Parts list:
- I assume you'll be going through Drawcom again, and suspect that rather than specifying unique part numbers to them are required, it *may* be better to re-outline the essential items,
(antenna, transceiver and DCU), and they can offer a commisionable-build based on that architecture.
-

3,. Optional / commisioning items.:Some observations / lessons from 22 build
- The Interswitch unit is IMO **not required**. Its a redundant large box of (mostly) air which multiplexes multiple KH radars to a single KH processor, and is was not required for KH's commissioning, 22
- The Radar processor and display (MDD-A30-20 + MDP-A1) , while **not required** for our medium-term operational solution, *may* be required/ mandated (only by KH) , to ensure warranty /installation compliance, assuming that KH are employed to conduct set-to-work activities. (if KH are to do this).
The idea being that they set-up the system as per a normal ship or VTS installation and test, proving that the system works. This was potential useful when finding the power supply fault in CI upmast tranceiver , and we restored to the KH baseline to prove to the technician that it wasnt our attached sub-system that was causing the issue.
- However an advantage of NOT including this "KH baseline" path is
  - Not having to schedule and pay for the KH technician (from UK or Malaysia) to come to CKI (we connect / commision ourselves to our own baseline from start).
  - Not having to maintain a 'dual-baseline' hardware capability. which includes cabling and storage of (display / processor) hardware.
  - Cheaper to buy since no display or processor purchased.
  - easier to install, since dont have to find space/shelter to temporarily install and connect display + processor.

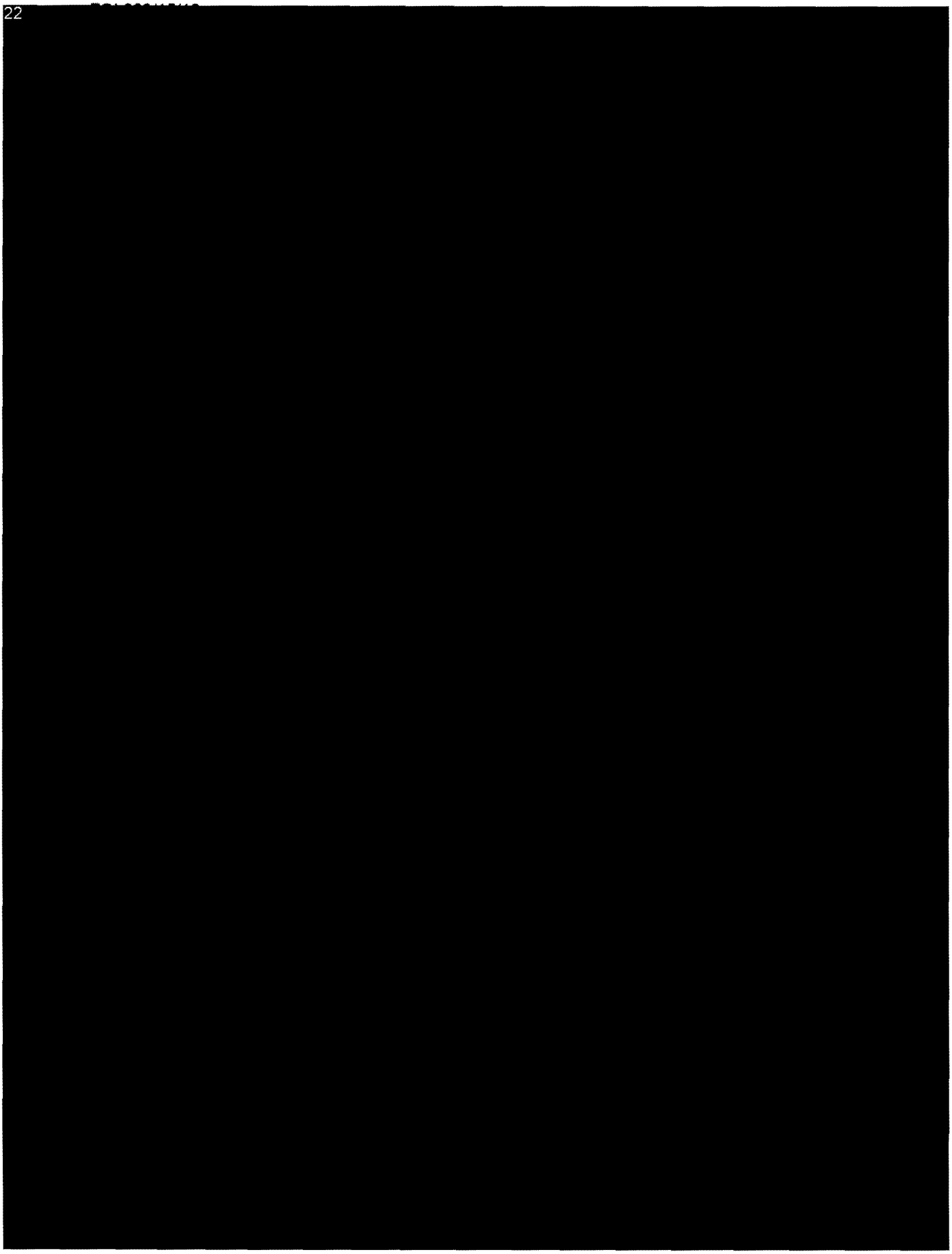
If KH are happy to sell us just the 3 HW items (LPA-A3 + DTX-A1 + GTX) plus cables , and optionally install to our baseline (without test) , whilst maintaining warranty agreement, that might be most desirable from my perspective.

Dave M.

22 [redacted]

22

[redacted]


22

22 [redacted]

Dowling, Emily

Serial 21

From: Merrett, David
Sent: Friday, 8 November, 2013 9:57 a.m.
To: 47F
Subject: RE: Tower and Trailer info- [SEC=UNCLASSIFIED]

Categories: UNCLASSIFIED

UNCLASSIFIED

Hi 47F
2 unrelated things..

22 [redacted]

2. Re possible Cocos implementation HW (ref below) , after our last converstion , I starting wondering if you were thinking of a small rack-solution (with radar HW) co-mounted with mast or gen. hardware (??) .... then I realised this would require a cooling system to be added, which although really attractive as a turn-key portable solution, also increases complexity (security, redundancy, reliability, maintenance). Just thought I'd comment in case further discussions are warranted in this direction.

Regards,
Dave M.

22

[redacted]

Dowling, Emily

From: Merrett, David
Sent: Wednesday, 6 August, 2014 10:33 a.m.
To: 47F
Cc: Peter Linnett
Subject: UPS Battery [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

47F

I thought Id mention the UPS specs here incase its relevant for transport planning.
These are from User Manual:

1. Type: SLA, **72 Vdc (6 12V, 9 Ah)**
2. Unit Transit Altitude: Up to 10,000 meters (32,808 ft) above sea level (If related to the SLAs, then I take this as 'lowest allowable pressure" ..Im not sure if this is an issue, or what the actual reason for this spec is).
3. User guide Recommends internal disconnection prior to flight. (Fair enough – we could also easily remove it from UPS, and store in flight-suitable container?)

David Merrett
Radar Systems Engineer,
DSTO.
08 73895622

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22 [redacted]

22

Dowling, Emily

From: Merrett, David
Sent: Wednesday, 22 October, 2014 9:33 a.m.
To: 47F
Cc: 47F
Subject: CKI ISP status [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

Hi 47F ,
I notice a 'tracroute' to our IP ends up on CKI, but timesout bouncing between 2 routers (?).
Other ".CC" sites are up, so Im starting to think the pacific storms are over ,and some other consequence is now preventing access to our site.
Perhaps you could contact 47F to investigate?
(Im happy to, but not sure if you want DSTO leading this kind of work on CKI).
Cheers,
Dave M.

David Merrett
Radar Systems Engineer,
DSTO.
08 73895622

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Dowling, Emily

From: Merrett, David
Sent: Wednesday, 30 July, 2014 11:48 a.m.
To: 47F
Subject: CKI Target of opportunity? [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

Hi 47F
It occurred to me that without any kind of vessel beyond 1-2 nm of our site, optimising the system will be difficult. If you haven't already, perhaps you could contact ACBPS on island to either use or identify a small vessel for this task , or at least provide POCs for our own arrangement. ?
Ideally , getting a RHIB-sized vessel to linger around 5-15 nm N thru W at least a few hours every day starting from the day it starts spinning . If too difficult, We could also potentially make up and bring a couple of the spar-buoy reflectors that could be dropped to drift past the field of interest, reducing the vessel time-on-task.
This doesn't need to turn into a calibration trial, its more about being able to leave, confident that there is at least a reasonable surveillance capability present.
Let me know what you think
Cheers,

David Merrett
Radar Systems Engineer,
DSTO.
08 73895622

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Serial 25

Dowling, Emily

From: Merrett, David
Sent: Monday, 18 August, 2014 10:50 a.m.
To: 47F
Subject: RE: Power supply for Cocos Island radar [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

47F ,
Keeping in mind this is *not* essential -In order of preference,

1. Use CAT-6 instead which will work. But If not avail...
2. Install an empty conduit containing pull rope (I would bring a roll of CAT6 which will work probably to 1Gbps, certainly 100M – either way it gives future flexibility)
3. OM3 fibre with SC connector. (should easily go to 1Gbps) – a bit more cost I assume, but future-proof.

Ref, Discussion below.
David Merrett
Radar Systems Engineer,
DSTO.
08 73895622

Notes:
As we are already planning on bringing a 5GHz wirelless LAN link , (I think it can do 100mbps) , copper /fibre is ***not*** currently essential. I mentioned adding Ethernet cable - anticipating that upon arrival, presence of a copper link
- would remove the work we would otherwise have to do in setting up the wireless link (potentially we'd then have it free to use as link to Bungalows!)
- be useful for on-going / future needs of connectivity.

So If its fibre, that's ok, but we still have work do to (acquiring and installing the fibre<>Ethernet interface adaptors).

22 [redacted]

Dowling, Emily

From: Merrett, David
Sent: Tuesday, 7 October, 2014 2:07 p.m.
To: 47F
Subject: RE: Transition activity of CKI radar to 2CA [SEC=UNCLASSIFIED]
Attachments: Development_concept.docx

Categories: Cocos

UNCLASSIFIED

47F ,
Just a heads up: Our lessons from 22 meant that it would have been engineering foolishness to replicate the software *architecture* used in transferring and formatting data.
I may have alluded to this in emails about some testing we did earlier this year.
Attached is a diagram that explains the difference between the current 22 system, and the system we are proposing.
Hopefully its obvious that the CKI HMI software proposed on 2CA is

- A single setup of a software module, with multiple functions (22)
- A more rational approach to transferring data.

Based on this, It may make more sense to include in any contracted SW transition work, to include testing of the 2 data feed into the new software element.
(as currently for 22 feeding to DSTO).
This would also

- allow removing the Windows PC as the HW element for AIS (less reliable COTS sw)
- Allow 22 AIS tracks.

Doing the above would require Daronomont to update the baseline of the 2 Software (essentially copy of DSTO's current 'staging area' software).

We will engage with Daronomon to this effect unless you arrange otherwise.

Regards,

David Merrett
Radar Systems Engineer,
DSTO.
08 73895622

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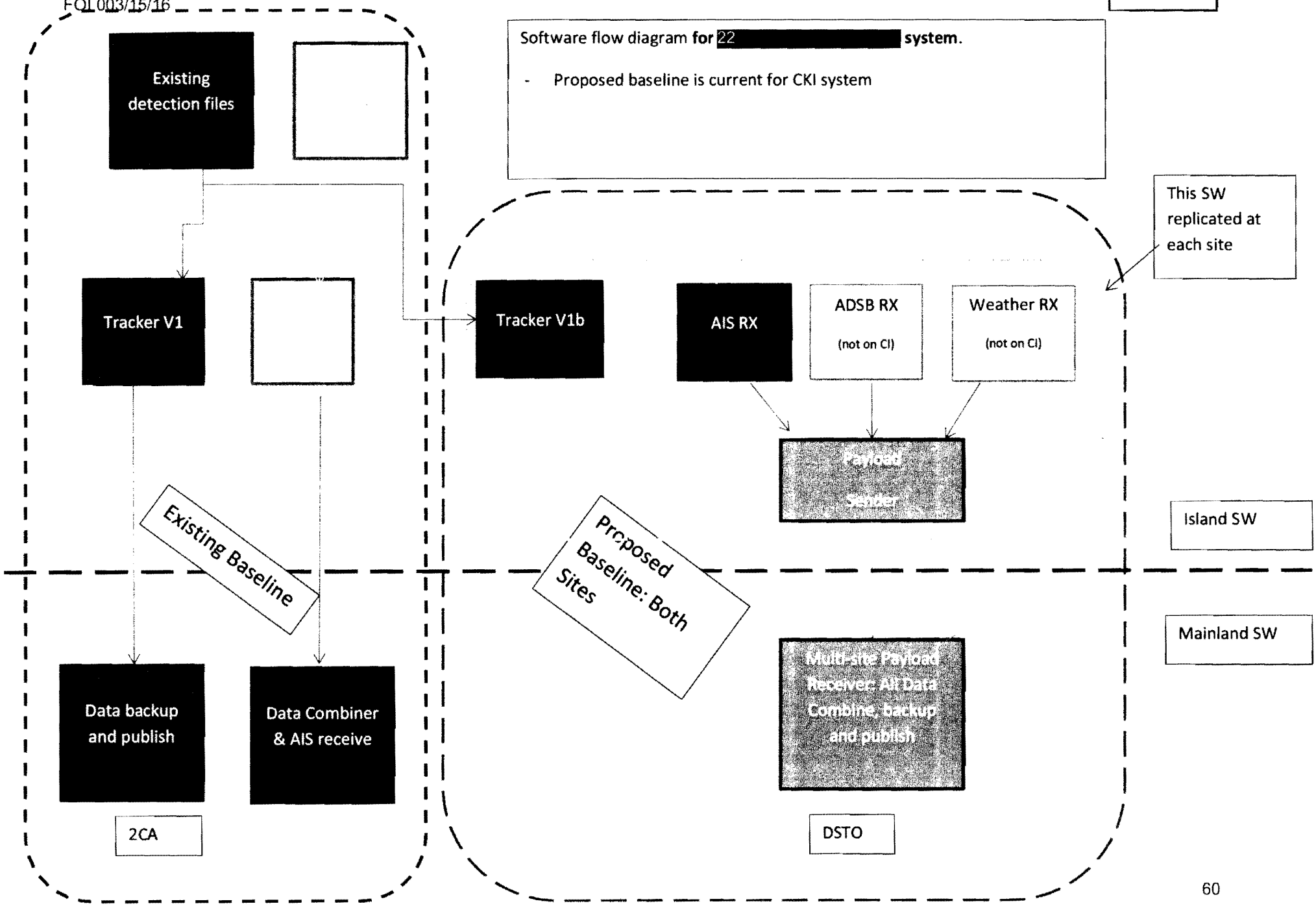
22

22

[redacted]

FQL003/15/16


Software flow diagram for 22 [redacted] system.
- Proposed baseline is current for CKI system
Existing detection files
Tracker V1
Data backup and publish
Data Combiner & AIS receive
2CA
Existing Baseline
Proposed Baseline: Both Sites
Tracker V1b
AIS RX
ADSB RX
(not on CI)
Weather RX
(not on CI)
Payload Sender
Multi-site Payload Receiver, All Data Combiner, backup and publish
DSTO
This SW replicated at each site
Island SW
Mainland SW

Dowling, Emily

From: Merrett, David
Sent: Tuesday, 15 October, 2013 3:54 p.m.
To: 47F
Subject: RE: CKI report [SEC=UNCLASSIFIED]

Categories: UNCLASSIFIED

UNCLASSIFIED

Hi 47F
I cant think of anything important to add to this.
The only minor thing I can think of mentioning is that Im not sure who the potential 'audience' is , or how the doc might be 'used', but I did notice the *absence* of explaining the scope/aim of this evaluation...
- DSTO mentioned being part of the initial site eval.
- That this evaluation does not consider detail of expected radar perfomrance . (or conversely , that performance of any proposed installation was ouside the scope of this initial site evaluation)

Cheers,
Dave

22

22

Dowling, Emily

From: Merrett, David
Sent: Monday, 7 July, 2014 11:24 a.m.
To: 47F [redacted]
Subject: Sept Trip planning [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

Hi 47F [redacted]
Im currently planning WBS for 'boffin trip' to CKI for radar set-to-work in September, and seeking your clarification on following:

1. My proposal is approx. 2 weeks, day1-day7 with 2 DSTO people (prob myself and Brendan), and day7-14 radar test/track with 4 DSTO people (Andrew Shaw, Travis B, Me and Brendan)
2. ACBPS will fund this travel, which comes to ~$30k (TBC est.)

Let me know if you have any comments on this, and I will continue to plan accordingly.
Regards,

David Merrett
Radar Systems Engineer,
DSTO.
08 73895622

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Dowling, Emily

From: Merrett, David
Sent: Wednesday, 13 August, 2014 2:47 p.m.
To: 47F [redacted]
Subject: testing IP? [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

Hi 47F [redacted],
Any update on the SatComm IP for CKI and / or Adelaide testing?
I have an opportunity to include it in our network baseline document, but happy to leave as xxx.xxx.xxx.xxx if not certain.

David Merrett
Radar Systems Engineer,
DSTO.
08 73895622

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Dowling, Emily

From: Merrett, David
Sent: Thursday, 17 July, 2014 10:51 a.m.
To: 47F
Cc: Hennessy, Brendan; Bessell, Travis; Shaw, Andrew
Subject: ASA Building use [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

Hi 47F,
The DSTO team here are planning on using the ASA site building we inspected as an 'office' for the during of our visit, which might include things like

- Accessing power (laptop / wifi-supply)
- If not avail, bringing tables / chairs (we can probably borrow some deck-chairs / stuff from bungalows, or worst-case just use old / surplus boxes / crates etc)
- Potentially bring a kettle (bungalows) so tea / soup is avail. (STW more fun with a brew in hand)
- Cleaning an appropriate floor area (will borrow broom from somewhere)
- Putting up small wireless-point-to-point link to system (gaffer / cable-tie externally, with CAT-5 cable to a switch / router inside we shall also bring).
- Support items maybe like fresh water, bucket, soap, cups, towel

Once the radar is spinning , I expect we'll mostly be sitting inside, staring at laptop screens , popping out occasionally for a stroll on the beach, or checking on your goat-auditing
Hopefully this is all easily do-able, but please let me know if you foresee any issues, or need help with liaison process.

David Merrett
Radar Systems Engineer,
DSTO.
08 73895622

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Dowling, Emily

Serial 33

From: Merrett, David
Sent: Wednesday, 19 February, 2014 3:28 p.m.
To: 47F [redacted]
Subject: CKI comments [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

Hi,
- Just FYI: DSTO did its annual opstsrs briefing to DCJOPS today. Re ours (opstsr143) He queried how we were getting it to island, we said it was ACBPS responsibility, and that a range of options are being considered. which I said including flying. He asked if C17 had been looked at. (I said yes).

- David R's Sharpeye timeline looks a bit sad. In your opinion, does this alter anything implementation/planning-wise that DSTO needs to consider?

Dave M.

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Dowling, Emily

From: Merrett, David
Sent: Thursday, 30 October, 2014 10:29 a.m.
To: 47F
Cc: Bessell, Travis; Hennessy, Brendan; 'brad.waugh@ciia.cx'
Subject: ASA Site ISP router? [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

Hi 47F ,
It appears the cisco (ISP) Router (maybe the link-recovery settings at one or both ends?) at CKI is potentially not correctly recovering after an outage. Routinely Ive noticed the link to the island is fine, but radar-site access is not (perhaps after an island-wide outage?.. Ive wondered about calling the ionosphere guys to see if the link to their sys is working)
Although Im not sure if its due to an intermediate link failure (therefore beyond our control) , but there are a couple of settings within the small cisco router software that might be relevant (see below). I don't know what the current settings are.

When its back up, I'll log in to check.

David Merrett
Radar Systems Engineer,
DSTO.
08 73895622

From Pg5
http://downloads.linksys.com/downloads/userguide/WRT120N_V10_UG_NC-WEB,0.pdf

Connect on Demand: Max Idle Time You can configure the Router to cut the Internet connection after it has been inactive for a specified period of time (Max Idle Time). If your Internet connection has been terminated due to inactivity, Connect on Demand enables the Router to automatically re-establish your connection as soon as you attempt to access the Internet again. To use this option, select Connect on Demand. In the Max Idle Time field, enter the number of minutes you want to have elapsed before your Internet connection terminates. The default Max Idle Time is 5 minutes.
Keep Alive: Redial Period If you select this option, the Router will periodically check your Internet connection. If you are disconnected, then the Router will automatically re-establish your connection. To use this option, select Keep Alive. In the Redial Period field, you specify how often you want the Router to check the Internet connection. The default Redial Period is 30 seconds

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Serial 34

Dowling, Emily

From: Merrett, David
Sent: Wednesday, 15 October, 2014 1:47 p.m.
To: 47F
Subject: Daronmont meeting [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

Hi 47F,
The meeting with Daronmont went well. We spent some time summarising the new SW / HW systems on CKI, and the new web pages currently being trialled on DSTO server.
We went through the agenda topics as suggested by Brendan Y, with the following outcomes:

- DSTO says Moving current CKI baseline to 2CA is best done after at least 3 weeks of 'DSTO tidy-ups' of the code. This is mostly relating to differences between 22 and CKI systems, and minor code improvements.
- Use of the new code for both 22 and CKI would imply (unless other minor 2CA server SW mods are included) Changes to the watchdog 'technical' pages...
  - 22
  DSTO will discuss the intended final baseline functions / presentation of the web pages with Customs, so that the version updated by Daronmont to 2CA closely match ACBPS's preferences.

- Differences between the CKI and 22 systems were exaplained, including AIS, ADSB, Generator states and data flows.
- DSTO to produce a small info docment showing IPs , account and passwords of the CKI sub-systems .
- DSTO has only looked briefly into alternatives to Google maps, and suggested Open Layers as a possible candidate replacement HMI environment.

David Merrett
Radar Systems Engineer,
DSTO.
08 73895622

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Serial 35

Dowling, Emily

From: Merrett, David
Sent: Wednesday, 23 July, 2014 9:18 a.m.
To: 47F
Subject: DSTO Pack up planning [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

47F ,
It occurred to me that there's going to be a bit of logistical planning and mechanical activity needed regarding the breakdown and movement of the complete platform to the raaf base. At this stage it'd be nice to have some kind of picture as to how it might all happen.

- Are we (Commonwealth) entirely responsible for this? (IE Do CBO essentially stand back and wait?)
- Can you clarify the intended breakdown of goods into the 2 C-130s? and order of depature?
- Are you intending on organising / planning the activity sequence and resources (trucks, forklifts, tiedowns , people etc) required?

Please let me know if/how you want DSTO involved. I expect to be involved in removal and packaging / securing of the external radar units, and we have a forklift and small truck on site .
Perhaps this can be a topic of discussion during your visit next month. ?

One idea I'll leave with you with is re how to mount radar on mast...: DSTO or CBO welding up a simple attachable "inverted y" frame (with side bracing) that could bolt / clamp onto last few feet of mast (in horizontal position). A small block and tackle chain onto the 'bottom' of the 'y' (ie top) could then easily lift both the radar and antenna. This would eliminate manual handling or vehicles being involved, and it could be used at both CKI and DSTO sites, and potentially even stay with the whole kit for life.

Regards,

David Merrett
Radar Systems Engineer,
DSTO.
08 73895622

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Serial 36

Dowling, Emily

From: Merrett, David
Sent: Thursday, 7 August, 2014 10:42 a.m.
To: 47F
Cc: 47F ; Hennessy, Brendan
Subject: Future Access / Use [DLM=For-Official-Use-Only]

Categories: No Security Classification Required

For-Official-Use-Only

47F ,

I agree in the *long* term DSTO should not be required to access the system for any *engineering*-related issues. Here are a few points that should be considered if /when access is to be reduced/removed. They boil down to

- ***DEBUG ISSUES:*** Over the past months, Daronmont have requested us for information / investigation into system-related issues / problems . This requires us to access the systems.
- ***ENGINEERING***: There has never been any well engineered design of the bits of the entire system outside of the 22 sub-system . DSTO has typically been doing this in an ad-hoc way, (incremental evolve / improve, since nobody else is available to do this)
    - This involves everything between the output of the tracker to the AMIFC screens
    - For the CKI subsystem deployment (22) , we are proposing to make a significant change / improvement in this software subsystem that sits between the output of the tracker & the AMIFC screens. Unless Daronmont are tasked to conduct the integration /test of this into the BPC-located server, DSTO will need access for this.
- ***SENSOR IMPROVEMENT*** Transfer of experimental / RF data (eg for improving system performance) is best done through the Mainland server.

David Merrett
Radar Systems Engineer,
DSTO.
08 73895622

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Serial 37

Dowling, Emily

From: Merrett, David
Sent: Monday, 11 August, 2014 9:17 a.m.
To: 47F
Subject: FW: S-Band Radar Licesnse request [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

47F
All good to TX on CKI and at DSTO.
Dave.

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22 [redacted]

22

[redacted]

Serial 38

Dowling, Emily

From: Merrett, David
Sent: Friday, 20 September, 2013 11:16 a.m.
To: 47F
Subject: FW: Cocos Infrasound station [SEC=UNCLASSIFIED]

Categories: UNCLASSIFIED

UNCLASSIFIED

FYI.
Useful stuff.
Dave

22 [redacted]

From: Merrett, David [mailto:David.Merrett@dsto.defence.gov.au]
Sent: Thursday, 19 September 2013 4:34 PM
To: Nancarrow Shane
Cc: Purss Matthew; 47F
Subject: Cocos Infrasound station [SEC=UNCLASSIFIED]

UNCLASSIFIED

FOI 003/15/16

Greetings Shane,

I recently visited Cocos Is with ACBPS personnel to investigate potential areas to site a smallish microwave maritime navigation radar, and we stumbled upon a recently-installed station at 12° 8'46.32"S, 96°49'9.90"E that is apparently (according to BoM) operated and managed by Geoscience Australia. (See attached pics).

I was hoping you could get in touch and let me know

- If the installations in question (see pics) belong to your group within GA?, and are there any other GA-owned installations within the area.?
- What the radio operating frequencies of the equipment / support comms is that might need to be considered in any EMC analysis.?
- Any other limitations / consideration that might become relevant should this area be used for mounting a small mast holding a maritime navigation radar.? (any such mast would be at least 100M from the secure hut pictured).

Please note at this stage, these are only preliminary invsetigations , and we are conducting discussions with ASA / DORA before any formal planning or site-use that may take place.

Thanks for any help you can provide in this matter,

Regards,

David Merrett
Radar Systems Engineer,
DSTO,
Dept. Defence.
087389 5622.

Serial 39

Dowling, Emily

From: Merrett, David
Sent: Thursday, 19 September, 2013 2:07 p.m.
To: 47F [redacted]
Subject: FW: DSTO visiting Cocos Is [SEC=UNCLASSIFIED]

Categories: UNCLASSIFIED

UNCLASSIFIED

FYI.

22 [redacted]

22

[redacted]

Serial 40

Dowling, Emily

From: Merrett, David
Sent: Friday, 1 August, 2014 12:44 p.m.
To: 47F [redacted]
Subject: FYI:FW: S-Band Radar Licesnse request [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

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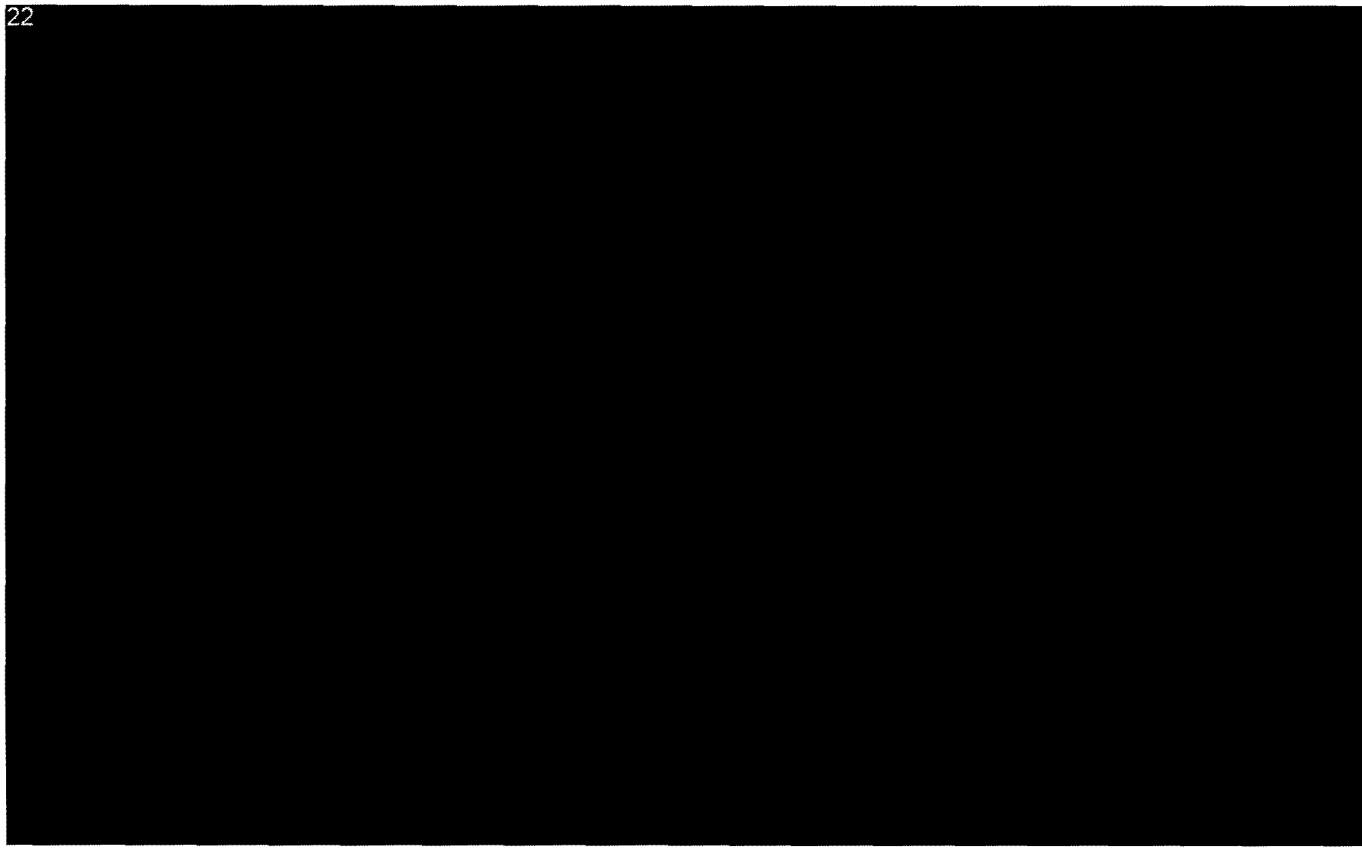
22 [redacted]


22

Serial 41

Dowling, Emily

From: Merrett, David
Sent: Tuesday, 3 June, 2014 2:21 p.m.
To: 47F [redacted]
Subject: Name of DSTO / RAAF site [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

I just heard back from one of the facility guys..
"When I telephone RAAF people regarding using the FPS-16 I say that I am at the DSTO RADAR building (adding located South East of the runway if they don't seem to understand that). For paperwork the 0939/T0015 building ID would probably be required but when describing where to go over the telephone you may have more luck with "DSTO RADAR building".

Previously , email to Defence support group (DSG) were headed like this..
The Sensor and Trials Facility (STF) is a DSTO facility, located at RAAF Edinburgh Technical Area Building 15.
It is located south of the southern exit to the Edinburgh RAAF Base.
Reference number 0939/T0015 identifies this facility.

For access:
" I don't think there is another route to the RAAF base. As well as a drainage ditch there is another fence North and West of the bore sight tower so you can't continue through the paddock. The bollards are supposedly arranged such that a fire truck can get through them but if you were carrying a container on a fork lift it would be too wide (though you may be able to lift it over the bollards - they are 1 metre cubes). I suspect it wouldn't be worth the time to arrange to have the gates opened compared with driving out 4th Avenue and going into the RAAF Southern entrance. "

Ill let you know more as it comes along.
Dave.

22 [redacted]

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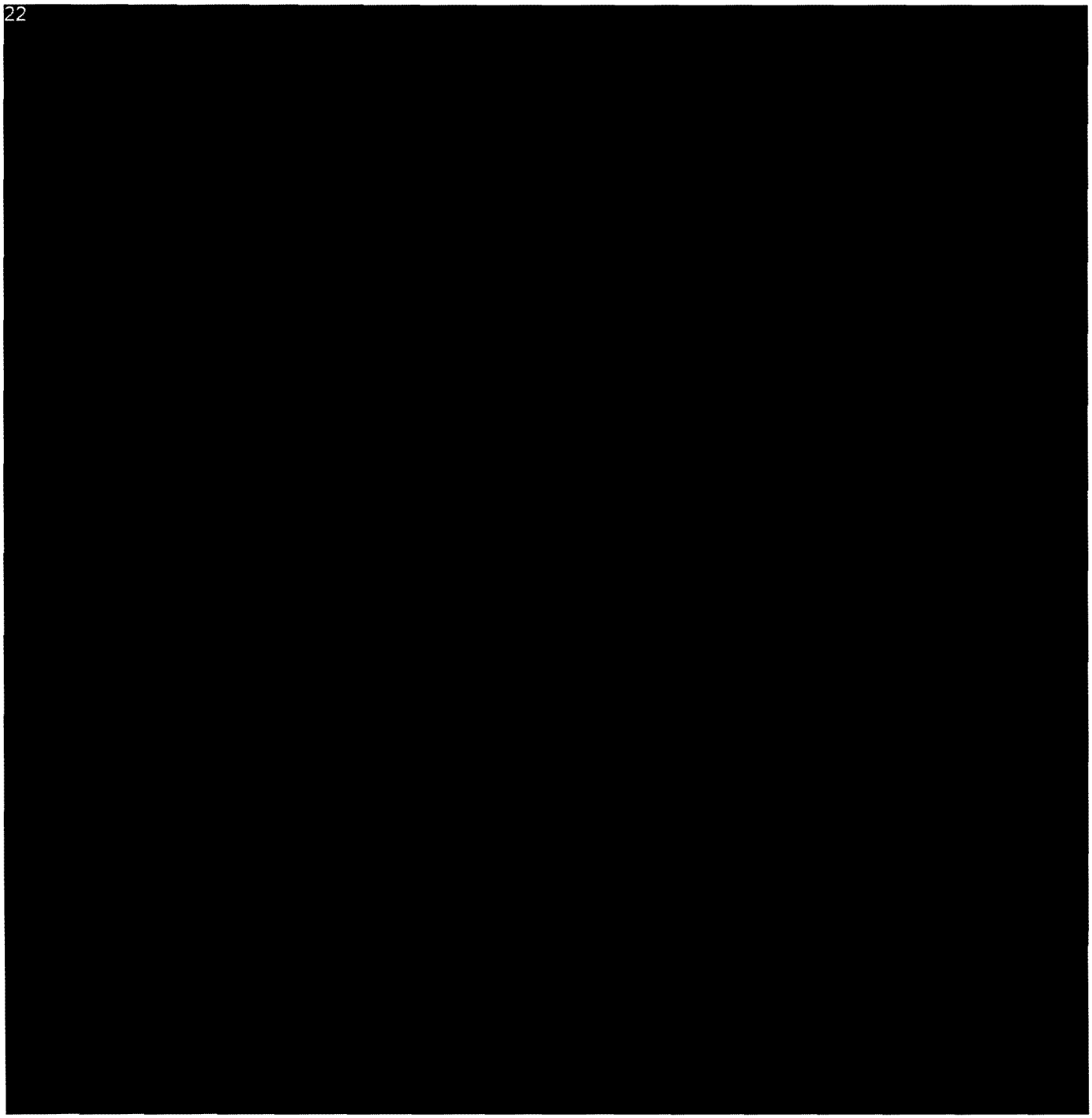
From: Merrett, David
Sent: Tuesday, 3 June, 2014 1:41 p.m.
To: 47F [redacted]
Subject: RE: Name of DSTO / RAAF site [SEC=UNCLASSIFIED]

UNCLASSIFIED

Im checking things now, and I believe I can give you a site address / lat-long / directions to a suitable piece of DSTO-controlled paddock.
HERE is the Sensor Trials Facility paddock. The bdlg to the SW is the actual STF.

Im also checking whether there is an esier way between the STF site and the tarmac / air-movements (versus default travelling back through main sec. gate).

22



Serial 42

Dowling, Emily

From: Merrett, David
Sent: Tuesday, 14 January, 2014 11:46 a.m.
To: 47F
Subject: Plan. [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

Hi 47F,
To clarify what we've previously discussed re DSTOs OPSTSR143 Project plan response, Is the following *roughly* in line with what you're thinking? To be clear, this is not set in stone, but I figure we may as well make our first response written closer to the currently planned intent.

OPSTSR 143 is a joint effort between ACBPS and DSTO to meet the intent provided within BPC's Oct'13 support request.

PRODUCTION
1.
- DSTO to purchase, integrate and test all internal and external electronic equipment (with exception of external VSAT hardware and any external electricity supply). Costs of major equipment items would be recovered by invoice(s) to ACBPS. Minor costs absorbed by DSTO. Carried out at DSTO Edinburgh.
- DSTO Produce networking-setup and software to replicate user display feed into BPC akin to existing 22 user products.

Question: As a radar head ....
- is still undecided (terma ? Kelvin Hughes ?)
- was previously purchased directly by ACBPS (Sharpeye via Hugh Barkley)
- is likely > $100k, hence requires defence 'complex procurement' rules.

Can ACBPS arrange direct purchase of the radar head for CKI?

2. ACBPS manage (with relevant design-etc support from DSTO) provision of a hardware platform on which the equipment is to be mounted.

DEPLOYMENT
1. DSTO Send 'set-to-work' team to CKI to
   - install
   - test
   - tune / optimise,
   - evaluate/trial CKI system

   with travel costs invoiced to ACBPS (??)

2. ACBPS to arrange shipping of platform from mainland to CKI, supported by DSTO as required.

Indicative Timeline:
Jan-Feb'14:
- purchase electroinc hardware
- support design / aquistion of HW Platform.

Mar-Apr '14
- Bare Platform delivered to DSTO Edinbrugh (Late feb would be nice).
- DSTO Integrate test etc.

Apr-May '14
- Shiping to CKI

- Joint Install.

22 [redacted]

Would that be ok with you?

Thanks for any feedback.
Regards,
Dave M.

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Dowling, Emily

From: Merrett, David
Sent: Tuesday, 14 October, 2014 3:27 p.m.
To: 47F [redacted]
Subject: RE: CKI capability statement [SEC=UNCLASSIFIED]
Attachments: CKI_still_detns_disp_zm.png; CKI_still_detns_disp.png

Categories: Cocos

UNCLASSIFIED

Ill get onto this today.
Incidentally, we have temporarily turned on 'stationary tracks display' (from which Ive attached screen shots).
It shows how any slowly drifting vessel may not get displayed by the conventional radar (moving tracks-only) screen, and where the channel markers are.
I guess there's some food for thought as to the kinds of operator pictures might be relevant in different contexts, and the drivers of reuqirements that might end up specifying any software changes to implement them.
You can probably imagine that theres a variety of possible HMI adjustments/ improvements that could be made. (EG: Just one of many improvments would be to hard-code (instead of track) channel markers onto map, so they help operators know where vessel detection will be degraded, and to aid any possible SAR activity)

Regards,

David Merrett
Radar Systems Engineer,
DSTO.
08 73895622

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22 [redacted]

22

Dowling, Emily

From: Merrett, David
Sent: Wednesday, 15 October, 2014 9:36 a.m.
To: 47F
Subject: RE: CKI capability statement [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

47F

Here's the DSTO response. Parts of it might be a bit 'geek-speak' , but Im sure you can translate.
Def: A radar 'detection' is a single 'hit' from a single turn of the antenna. Each antenna turn generates around 1000 detections. The tracker software makes sense of these over many minutes / hours, and presents sequences of detections that appear to be moving like a vessel, as a radar 'track'.

- The 'Confidence' is a % measure of the tracker's certainty that there is some radar-reflective thing present. Things that are radar-reflective *might* include things like
    - Birds
    - Helicopters
    - Boats
    - Rain / heavy clouds
    - Sea waves / swell

  It is calculated from the number of detections associated to the track over time (ie confidence will increase as the track receives associated detections and will drop when the detections disappear).
- The Signal level is a measure (1-100)of the average radar signal level for this tracked object, over a period of 2 minutes. It is purely relative, and visually similar to the brightness of the 'spot' typically present in the middle of the mini- movie display.

- Tracks are hidden from the operator unless they meet certain criteria.

33

Let me know if you need any clarification or other details.
Regards,

David Merrett
Radar Systems Engineer,
DSTO.
08 73895622

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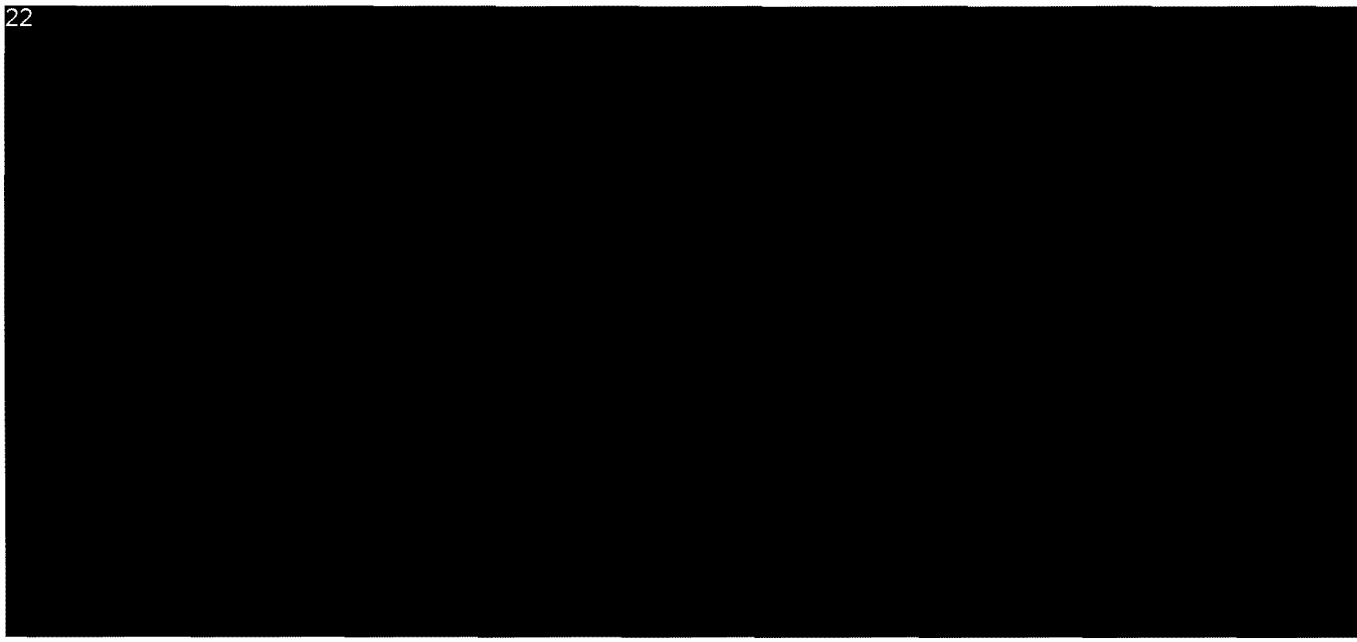
22

Dowling, Emily

From: Merrett, David
Sent: Wednesday, 15 October, 2014 8:55 a.m.
To: 47F
Subject: RE: KH Sharpeye arrival [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

No, but Ill check through the documentation and see if its included somewhere in the delivery notes.
Technically there will be 4 serial nos.

- Antenna
- Up-mast unit
- RDU (Main visible box- which an asset sticker would go)
- Service PC. (not normally used)

KH would probably be happy to provide s/n via drawcom if you asked.

Dave M.

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22 [redacted]

From: Merrett, David [mailto:David.Merrett@dsto.defence.gov.au]
Sent: Wednesday, 7 May 2014 4:35 PM
To: 47F
Subject: KH Sharpeye arrival[SEC=UNCLASSIFIED]

UNCLASSIFIED

I Opened the KH boxes this afternoon (expect for antenna).

- My biggest surprise was the **item "Service and Maintenance Display "** which (after looking 'in under the bonnet") included a COTS digitiser / acquisition system from Cambridge-pixel , which seems strikingly similar to the one weve already ordered for the CKI server system... although the Cambridge-pixel one is probably more capable, as it uses newer components.

- This Sharpeye model seems much sleeker and adaptable to our needs than the original, eliminating the need for DSTO-mods...although rack-mounting may be trickier if we want to maintain access to internals.

- Only 2 of the boxes had packing lists . I havent found hardcopy of manuals yet (hopefully in the antenna box).

Cheers,
Dave

22 [redacted]

From: Merrett, David [mailto:David.Merrett@dsto.defence.gov.au]
Sent: Wednesday, 12 February 2014 3:30 PM
To: 47F [redacted]
Subject: RE: KH Sharpeye purchase [SEC=UNCLASSIFIED]

UNCLASSIFIED

Hi,
Just glancing at the PO, and trying to figure out where the added 47G [redacted] comes from
"INSTALLATION AND WORK SCHEDULING 47G [redacted]
Its more than the "Customer Witnessed Factory Acceptance Test (FAT) first week" (Quote Sec 3.3)
Line 3 PO appears to be already covered under "Installation Support and supervision, program management" .(below). Am I missing something ?
Dave

2 PRICES & SCOPE OF SUPPLY (SBS-800-51) **Part Number**	**Description Radar System SBS-800-51**	**Price**	**Qty.**	**price $**
SBS-800-51	SharpEye S-Band 200W Up-mast Solid State Transceiver and tuning mechanism , EDPC and Doppler) Comprises;	1		-
DTX-A1-ADDA /LPA-A3	Assy of SBS-800-51 S-Band Transceiver, 12ft. 32dB SWG Low Profile antenna with turning mechanism.	1		-
SBS-A1-2	RDU Radar Distribution Unit	1		-

	(RDU) Serial control Interface RS232/422 with antenna drive control unit			
KH-1601	SBS-800 Series Radar Sub-System Manuals (Hardcopy one set)	1	-	
SBS-A3-3	Service and Maintenance Display with radar viewer and radar control GUI SW in a 19" Rack Mount Service PC with 22" LCD Screen	1	-	
Hardware subtotal	47G	1	47G	
Part Number		**Installation Materials Kit SBS-800 Series**		
SBS-A801-50	Copper Installation Kit [50m] Includes Man aloft switch and cables to antenna subsystems	47G	1	47G
SBS-A801-[X]	Additional Meters of Copper Cable kit pr. 10m	47	0	4
SBS-A123-5	Cable Kit Extractor [5m]	47	1	47
Part Number		**Installation Support and supervision, program management**		
KH-XXXX	Adelaide (1 week nominal) Installation and setting to work excluding travel, accommodation and subsistence	47G	1	47G
KH-XXXX	Estimated travel, accommodation and subsistence Adelaide	47G	1	47G
KH-XXXX	Program Management and project related standard documentation.	47G	1	47G
Package Total		47G		

22 [redacted]

22

Dowling, Emily

From: Merrett, David
Sent: Wednesday, 15 January, 2014 10:02 a.m.
To: 47F
Subject: RE: Plan. [SEC=UNCLASSIFIED]

Categories: UNCLASSIFIED

UNCLASSIFIED

Thanks for reponse 47F,
Another issue id like to ping you about is security grading.
Previously (22
- the hardware and design was UNCLASS
- operational networking aspects was restricted. (-> protected)
- System performance was restricted. (-> protected)
- Planning Timeline / Administrative aspects was Unclass.

Do you believe a similar approach is suitable for CKI ?
Thanks,
Dave M.

22

From: Merrett, David [mailto:David.Merrett@dsto.defence.gov.au]
Sent: Tuesday, 14 January 2014 11:46 AM
To: 4
Subject: Plan. [SEC=UNCLASSIFIED]

UNCLASSIFIED

Hi 47F
To clarify what we've previously discussed re DSTOs OPSTSR143 Project plan response, Is the following *roughly* in line with what you're thinking?
<...snip>

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Serial 47

Dowling, Emily

From: Shaw, Andrew
Sent: Monday, 12 August, 2013 11:24 a.m.
To: 47F ; Merrett, David
Subject: RE: Follow up and possible Terma Radar Evaluation [SEC=UNCLASSIFIED]

Categories: UNCLASSIFIED

UNCLASSIFIED

Happy to help where we can.

To expand on David's email

I suspect that this system will be harder to deploy than what we can do from here but it may be easier politically especially as they keep offering their system. Also we only have available systems which are at the more basic end of radar capability.

The attached documentation is in regard to the antenna unit only and does not include information about the included transmitter/receiver and processing:

- Is this a magnetron based radar or a solid state radar with pulse compression?
- What is the peak power / average power (only has handling limits for the antenna in the document)?
- How many frequencies and over what span is the frequency diversity?
    - Is (delay line or similar) processing is included to align the frequency diverse signals?
- What processing is incorporated in the system?
    - Is there automatic detection?
        - What exploitation of frequency diversity is employed in the detection processing?
    - What scan-to-scan processing (if any) is included in the detection system?
    - Does the system include automatic tracking and track reporting?

The easiest to deploy remote system would be to attach the DSTO processing back end onto the Terma system, but to do this we would need to have details of the video data interface and turning data provision, also how frequency diversity squint is compensated.

Dr Andrew Shaw
Research Leader - Microwave Radar,
National Security and Intelligence, Surveillance and Reconnaissance Division (NSID),
DSTO Edinburgh
PO Box 1500
Edinburgh SA 5111
Ph: +61 8 7389 4207
Fax: +61 8 7389 5254
Mob: 47F *(does not operate within DSTO buildings)*

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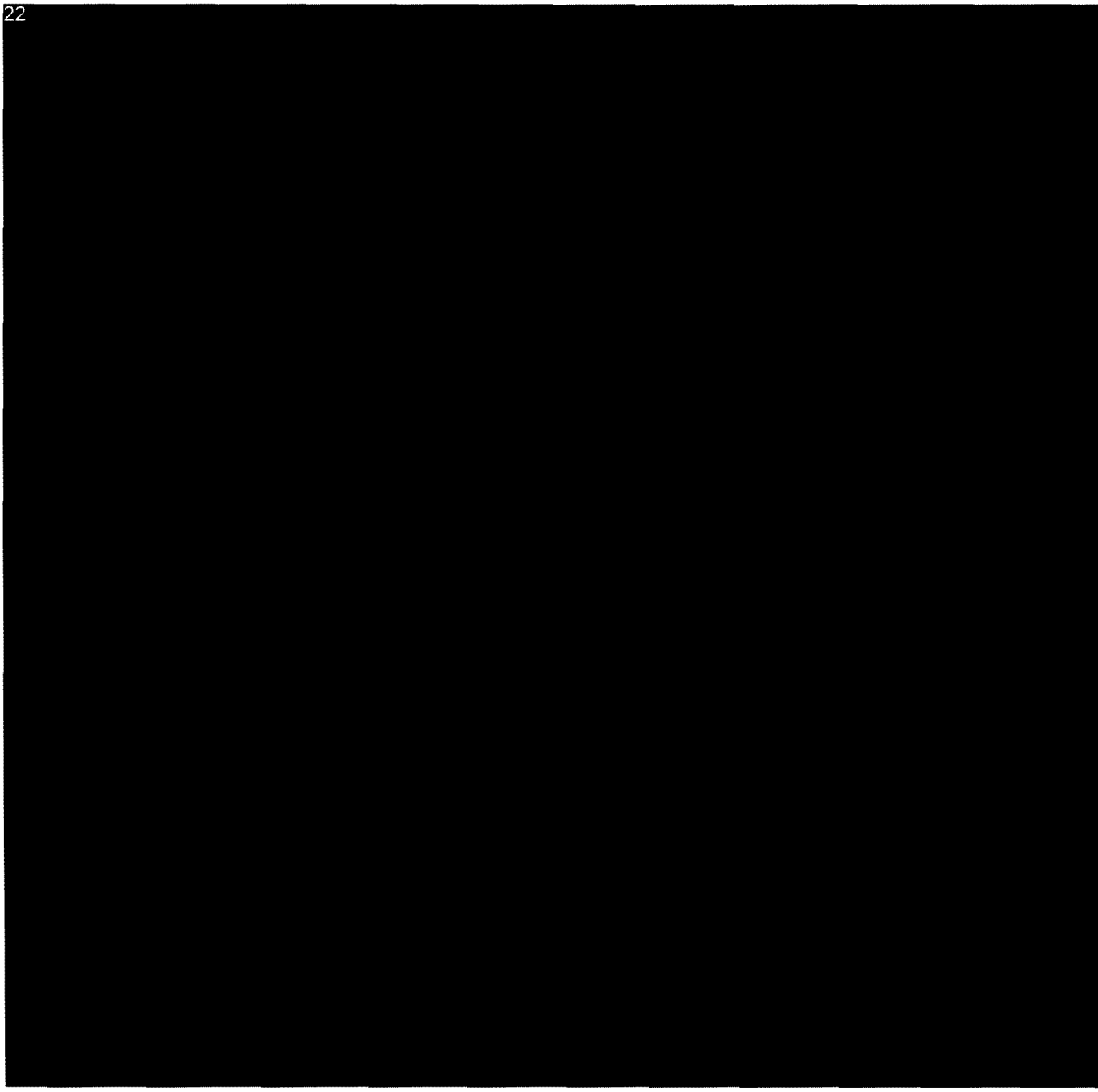
22 [redacted]

[redacted]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Dowling, Emily

Serial 48

From: Merrett, David
Sent: Monday, 9 December, 2013 2:20 p.m.
To: 47F
Subject: RE: Cocos Island Question [SEC=UNCLASSIFIED]

Categories: Cocos

UNCLASSIFIED

47F
Ive got nothing against using Terma per se. Going down that path would require much more information from Terma about their offering in technical detail, and what options and requirements they're willing to include / consider.
In the end , DSTOs preference will probably be guided by our effort required balanced against the 'research' returns, both of which are currently unknown with a Terma solution (see below for more).
Dave M.
22

Here's a brain dump of my thinking....
To me its more about the effort <> risk balance.
In other words, (for example) how much more effort is required to produce the same risk as the KH alternative?

The 2 least effort (DSTO) paths are:
A) if it follows the KH-equiv path,
1. TERMA supply /install a radar head, with an analog video interface (or agreed digital), and SW (radar control) interface definition.
2. DSTO connect to clone of KH Computer+digitiser system, tweaking detector / tracker as required.
- This requires DSTO to get agreement and cooperation with TERMA on initial technical exchange.

B) TERMA Turn-key path...
1. TERMA supply and commision full kit
2. TERMA conduct system performance tuning / optimisation for cocos context.
3. TERMA / Other contractor develop/ adjust Human interface SW for 22 equivalent HMI requirements.
   - automous operation, low bandwidth, self-recovery, automated alerting, etc

Doing something in between these 2 (EG where DSTO tracker interfaces with Terma Detector, or DSTO SW is provided to Terma) is likely to be riskier, but shouldnt be discounted without more information.

The 2 big "unknown" areas for effort are

- Tracking (performance & user interface)
- Radar digitising / interfacing.

Some simple initial tech questions to Terma may go along way to understanding the effort required, so more informed decisions could be made.
Examples :
- What Radar > Computer interfacing do they offer? have they ever used "Osiris" digisiter cards?, what is their digitiser fidelity?
(22)

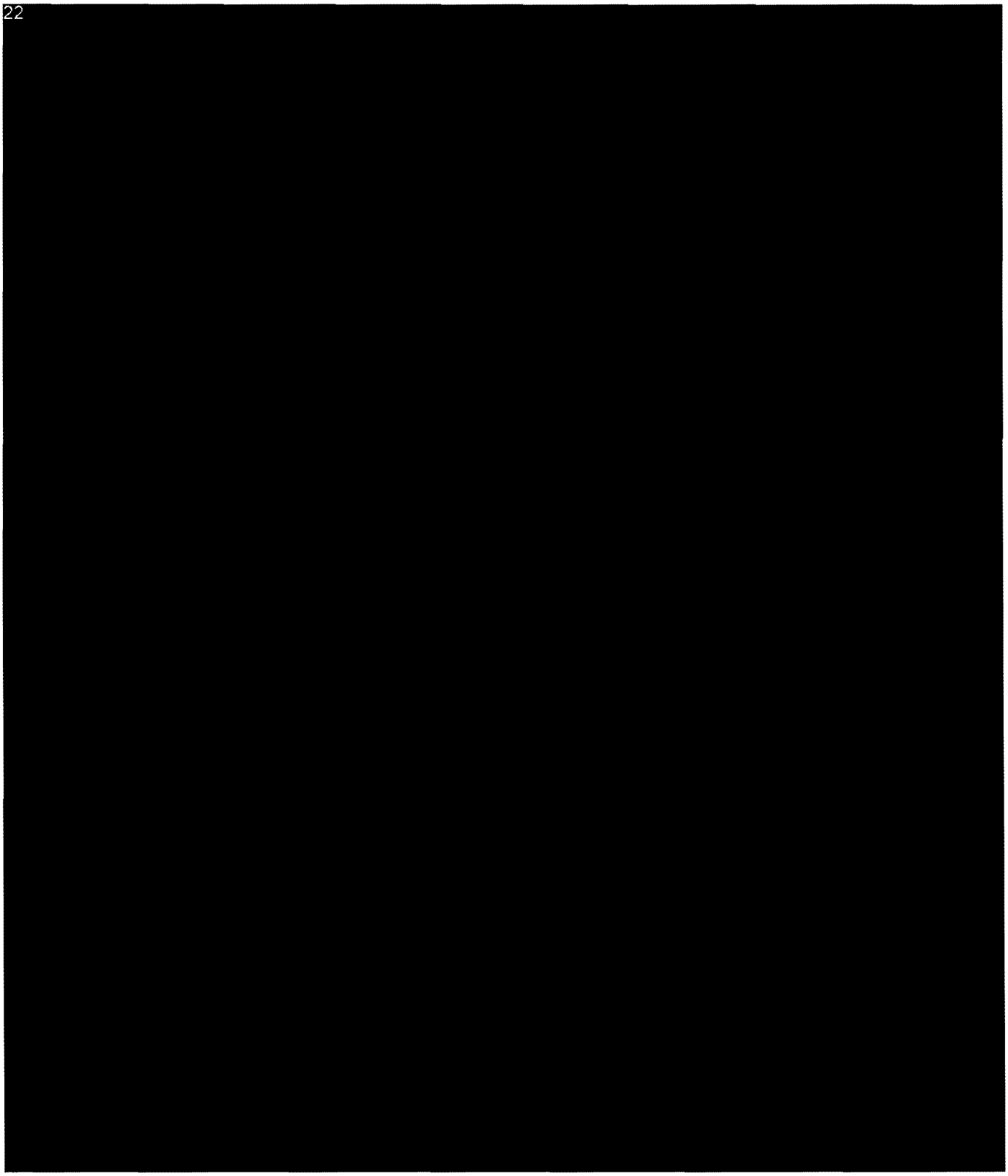
- Are they willing to allow DSTO access to realtime digital or analog video information through some defined interface?
(DSTO effort and / or engagement possible/required?)

- What *flexibility* is available within their detection & tracking SW parameters that define performance.? ("Tunability").
(performance risks / delays)

Are they hoping to supply a turn-key solution? DSTO involvement might then be more akin to 'watchover' / review roll. In that case, theyd have to spend a reasonable amount of time tweaking parameters to optimise the performance/ false-alarm-rate compromise. The radar-to-user (HMI) software is another area that would probably need design development.
This is another risk/effort for them.

Id also be keen to understand if they would propose a wave-guide-to-rack architecture, and if so, what experience have they had with these lengths (eg 33M) , inlcuding possible issues associated with being on relocatable-masts.

22



22

[redacted]

Dowling, Emily

From: Merrett, David
Sent: Monday, 12 August, 2013 11:22 a.m.
To: 47F
Cc: Shaw, Andrew
Subject: RE: Follow up and possible Terma Radar Evaluation [SEC=UNCLASSIFIED]

Categories: UNCLASSIFIED

UNCLASSIFIED

47F
I beleive the general idea of a drop-in container-ised solution is best and I think there are 3 primary questions to answer, which drive the rest of process...
1. For a first-trial, how rigourous / demonstrative should it be ? (eg: a couple of weeks with a portable generator vs running a few months unmanned)
2. If AMIFC-use of trial-system data products is considered part of a first-trial, how will this be developed , resourced & delivered - esp if from TERMA radar?
3. If trialling a TERMA solution, how does the anticipated theoretical performance of a permanent solution compare with the *desired* performance (eg X-band , possibly including sea-state 4 and / or heavy rain)

As a semi-manned trial, the additional installation engineering otherwise associated with making it a permanent solution would not eventuate. Ive guessed at a few factors for consideration below.
- EMI / EMC : X-Band pulse interference on nearby defence / commerical systems . ?
- Wind-loading movement-allowance calcs on a trial system...and resulting guy-cable requirements , or heavy-lifting/ erection machinery for un-guyed portable-mast?
- Power: 15KVA is mentioned (this is pretty high, and from a trial perspective, logistically quite different to a much more portable 2KVA gen) , but since a semi-permanent soluition is unlikely to rely on a generator for primary power, it seems logical any trialled locations would still be within economic-reach of an existing supply.

The radar-tech/specs side of things is another matter , and for performance predication / comparison , I guess it will largely boil down to "Considering the overall system objectives, how important is optimising performance in high-rain (X vs S band) and/or high-seas (which drives detector / tracker algorithms/ optimisation) " ?
I dont currently have enough information on the TERMA system to judge, but given the height limitations, I *guess* it would perform about as good as any similar system a good portion of the time. (IE those times when the sea / rain states are benign enough to produce little difference)

Thats my 2-cents.
Andrew may have a different take on the whole thing.

Regards,
David Merrett
Radar Systems engineer.
Natioanl Security and ISR division.
08 7389 5622

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Dowling, Emily

From: Shaw, Andrew
Sent: Friday, 2 May, 2014 8:36 a.m.
To: 47F
Subject: RE: CKI radar [SEC=UNCLASSIFIED]

Categories: UNCLASSIFIED

UNCLASSIFIED

47F

What format are these documents – I can't seem to open them ☹

DSTO Andrew Shaw

Research Leader, Microwave Radar
National Security & Intelligence Surveillance and Reconnaissance Division
Defence Science and Technology Organisation
PO Box 1500, Edinburgh, South Australia 5111

P 08 7389 4207
M 47F
E andrew.shaw@dsto.defence.gov.au

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22 [redacted]

22

Dowling, Emily

From: Shaw, Andrew
Sent: Tuesday, 25 June, 2013 10:43 a.m.
To: 47F
Subject: RE: OPSTSR [SEC=UNCLASSIFIED]

Categories: UNCLASSIFIED

UNCLASSIFIED

133 expired just about a year ago. Essentially we are working without any priority cover and without any formal client request for support.

Dr Andrew Shaw
Research Leader - Microwave Radar,
Electronic Warfare and Radar Division,
DSTO Edinburgh
PO Box 1500
Edinburgh SA 5111
Ph: +61 8 7389 4207
Fax: +61 8 7389 5254
Mob: 47F *(does not operate within DSTO buildings)*

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22 [redacted]

22

Australian Government
Department of Defence
Defence Science and
Technology Organisation

Minute

Joint & Operations Analysis
Division
DSTO
Edinburgh SA 5111

2013/Number/1

COMBPC

PROPOSED DSTO RESPONSE TO OPSTSR REQUEST – 22 [redacted] 22 [redacted] COCOS (KEELING) ISLANDS RADAR TRIAL

Reference:

A. E395622 – Letter – HQBPC – ACBPS MD to COMBPC OPSTSR – DSTO Support to 22 [redacted] Cocos (Keeling) Islands Radar Trial Activities, dated 4 September 2013

1. **Purpose.** Client endorsement of the proposed DSTO response to reference A is sought. This minute details the deliverables, costs, risks and impact on other DSTO clients of the proposed response.

2. **Request.** The OPSTSR proposal (E395622) requested DSTO to:

22 [redacted]

b. to provide technical support to the trial and possible commissioning of a land based marine surveillance radar installation on Cocos (Keeling) Islands (CKI).

It specifically proposed for support including:

22 [redacted]

b. DSTO personnel to participate in the feasibility study into the deployment of a land based radar system in CKI;

c. Design, construction, and deployment of a containerised trial radar system on CKI; and

d. Provision of interim and final reports and any associated briefs to COMBPC.

3. **Deliverables.** DSTO has analysed OPSTSR 143 and proposes to address this request utilising the plan at Annex A to deliver:

a. **Deliverable A.** Detailed project plans by phase for the radar trial on CKI;

b. **Deliverable B.** Design specifications for a radar system intended for installation onto a containerised platform suitable for deployment to CKI;

c. **Deliverable C.** Regular progress reports at an interval to be agreed with the ACBPS project lead;

d. **Deliverable D.** An Interim report to COMBPC on completion of the initial deployment to CKI; and

e. **Deliverable E.** A Final report to COMBPC that includes an assessment of the contribution that a land based marine surveillance radar can make to the management of Unauthorised Maritime Arrivals (UMA) within the approaches to CKI, a recommendation on the viability of commissioning such system at CKI and recommended specifications of such a system should it prove to be viable.

4. **Costs.** DSTO proposes to cover the cost of staff for this work. DSTO will assume responsibility for the second order costs associated with this program but seeks client endorsement of the operational nature of the work to support DSTO use of its operations funding for the associated net additional costs. The net additional costs for the full program are $26k which is itemised at Annex B. Non-salary expenses incurred by DSTO in respect of this OPSTSR will be charged against OP RESOLUTE.

5. **Risks.** Due to the extensive work successfully completed under OPSTSRs 125 & 133 22 22 the risk of completion of this radar system development for CKI is rated as LOW.

6. **Impact on other DSTO clients.** To affect this plan DSTO would need to delay work as outlined in Annex C. The impact on these lower priority activities is judged to be manageable and DSTO will work with these clients to mitigate the impacts where possible.

Client Endorsement

7. The DSTO manager of this OPSTSR is Dr Brett Haywood, of National Security and ISR Division, who can be contacted on (08) 7389 6053. He is available to clarify any aspect of the proposed plan.

8. DSTO seeks your endorsement that the proposed DSTO response to the OPSTSR request meets your intent and that the associated net additional costs can be resourced. On receipt of your endorsement Dr Todd Mansell (CJOAD) will initiate the appropriate DSTO program modification on behalf of CDS.

47F
47F

P MES
R h Leader, Current Operations
Joint & Operations Analysis Division

(08) 7389 4213

23 Jan 2014

ANNEX A

DSTO OPSTSR PROJECT PLAN – OPSTSR 143 – [22] AND COCOS (KEELING) ISLANDS RADAR TRIAL

Background

[33, 22]

2. A second approach corridor for UMA is from the direction of Sri Lanka bound for the Cocos (Keeling) Islands (CKI). [33] [33]

3. **Client Engagement Model.** Since the original request (Oct '13), subsequent planning by ACBPS has shifted and reduced the scope of the OPSTSR slightly. This combined with the good working relationship ACBPS has developed with DSTO [22] OPSTSRs, means that the best way forward is now a joint project approach where funds, skills and resources are divided in a way more relevant to long term outlook of the developed capability.

Customer Requirements

4. The primary requirement addressed under this OPSTSR is to trial a land-based maritime surveillance system on CKI. DSTO assistance is required to design and deploy the radar and to evaluate what contribution the system makes to the approach corridors to CKI.

[22]

5. The new OPSTSR will bring a benefit to BPC of a fully operational CKI radar installation and provide a clear understanding of its performance and maximum reliable detection range. This will inform any ACBPS decisions to acquire a permanent land based marine surveillance radar for CKI.

6. DSTO's responsibilities under the OPSTSR are to provide:

a. DSTO personnel to support ACBPS's production of a radar-suitable relocatable platform (tower+shelter)

b. Design, construction, integration and test of a trial radar system onto a platform for deployment to CKI; and

c. Provision of interim and final reports and any associated briefs to COMBPC.

7. **Assumptions**. The following assumptions have been made:

   a. This OPSTSR is to support OP RESOLUTE;

   b. DSTO will plan for a baseline system design similar to the existing [redacted] design;

   c. The client will engage with DSTO in a joint-project manner, to arrange delivery of agreed hardware; and provision of agreed support platforms, personnel and services in support of the OPSTSR; and

   d. The Area of Operations is primarily OP RESOLUTE.

8. **Security**. The following security issues will arise from the conduct of the OPSTSR:

   a. Collection and transport of materiel is UNCLASSIFIED; and

   b. Results of investigations, final report and briefings are classified up to PROTECTED with Sensitive caveats where appropriate.

9. **ADF Support Requirements**. None are required directly by DSTO. ADF support, if needed, will be facilitated and managed by the client.

10. **Constraints**. No constraints are imposed.

11. **Client Deliverables**. The following client deliverables will be generated:

   a. Project plans by phase for the radar trial on CKI;

   b. Design specifications for a radar system suitable for deployment to CKI on containerised platform;

   c. Regular progress briefs at an interval to be agreed with the ACBPS project lead;

   d. An Interim report to COMBPC on completion of the initial deployment to CKI; and

   e. A Final report to COMBPC that includes an assessment of the contribution that a land based marine surveillance radar can make to the management of Unauthorised Maritime Arrivals (UMA) within the approaches to CKI, a recommendation on the viability of commissioning such system at CKI and recommended specifications of such a system should it prove to be viable.

12. **Conduct of OPSTSR.** It is proposed that the OPSTSR should be conducted in three phases:

   a. Phase 1: To complete testing and integration of the system onto a suitable platform at DSTO Edinburgh by 15th April 2014.

   b. Phase 2: To complete system deployment and test by 1st July 2014.

   c. Phase 3: To complete evaluation reporting by 1st September 2014.

13. This Plan addresses all Phases.

14. **Key Dates.** The following table is a high-level summary of the OPSTSR [by phase if appropriate] schedule.

Ser	Due Date	Time Required	Person Responsible	Activity/Deliverable
1	16/04/14	7 weeks	Merrett	Integrated system tested at DSTO-E
2	09/05/14	4 weeks	Merrett	Draft System Documentation
3	12/05/14	2 weeks	Merrett	Installed and tested at CKI
4	02/06/14	3 weeks	Merrett	Evaluation plan
5	11/08/14	5 weeks	Shaw / Merrett	Distribute draft Client Report

Refer to figure 1 for initial planning snapshot

FOI 03/15/16

	Name	Duration	Start	Finish
1	**Planning & Procurement**	132 days	10/09/13 8:00 AM	12/03/14 5:00 PM
2	Site evaluation, allocation & procurement/lease	105 days	10/09/13 8:00 AM	3/02/14 5:00 PM
3	Design of Radar	50 days	2/01/14 7:00 AM	12/03/14 5:00 PM
4	Plan of dependencies, such as electricity, generators, freig	16 days	10/09/13 8:00 AM	1/10/13 5:00 PM
5	Procurement of Radar equipment (DSTO)	30 days	22/01/14 8:00 AM	4/03/14 5:00 PM
6	Procurement of Radar & associated equipment (ACBPS)	36 days	2/01/14 8:00 AM	20/02/14 5:00 PM
7	**Delivery and STW (DSTO)**	35 days	26/02/14 10:00 AM	16/04/14 10:00 AM
8	Delivery of Equipment to DSTO	0 days	11/03/14 8:00 AM	11/03/14 8:00 AM
9	STW @ DSTO	35 days	26/02/14 10:00 AM	16/04/14 10:00 AM
10	**Delivery and STW at CKI**	18 days	16/04/14 10:00 AM	12/05/14 10:00 AM
11	Receive and Move to site	10 days	16/04/14 10:00 AM	30/04/14 10:00 AM
12	Electricity connection	2 days	30/04/14 10:00 AM	2/05/14 10:00 AM
13	Install of radar	5 days	30/04/14 10:00 AM	7/05/14 10:00 AM
14	Test Vsat connectivity	2 days	30/04/14 10:00 AM	2/05/14 10:00 AM
15	Combine test of radar, AIS and Vsat connectivity	2 days	7/05/14 10:00 AM	9/05/14 10:00 AM
16	Performance optimisation and user interfacing	3 days	7/05/14 10:00 AM	12/05/14 10:00 AM
17	**Radar evaluation trial**	20 days	12/05/14 10:00 AM	9/06/14 10:00 AM
18	Equipment prep and send	15 days	12/05/14 10:00 AM	2/06/14 10:00 AM
19	Conduct trial	5 days	2/06/14 10:00 AM	9/06/14 10:00 AM
20	**Ongoing BAU & Support, Maintenance (ACBPS)**	280 days?	3/03/14 8:00 AM	27/03/15 5:00 PM
25	**Reporting / Documentation**	136 days	31/01/14 10:00 AM	11/08/14 10:00 AM
26	Ongoing status briefs	100 days	31/01/14 10:00 AM	20/06/14 10:00 AM
27	Draft system documentation	20 days	13/03/14 8:00 AM	9/04/14 5:00 PM
28	Trial/Evaluation plan	10 days	12/05/14 10:00 AM	26/05/14 10:00 AM
29	Trial quick look report	5 days	9/06/14 10:00 AM	16/06/14 10:00 AM
30	Final DSTO report	40 days	16/06/14 10:00 AM	11/08/14 10:00 AM

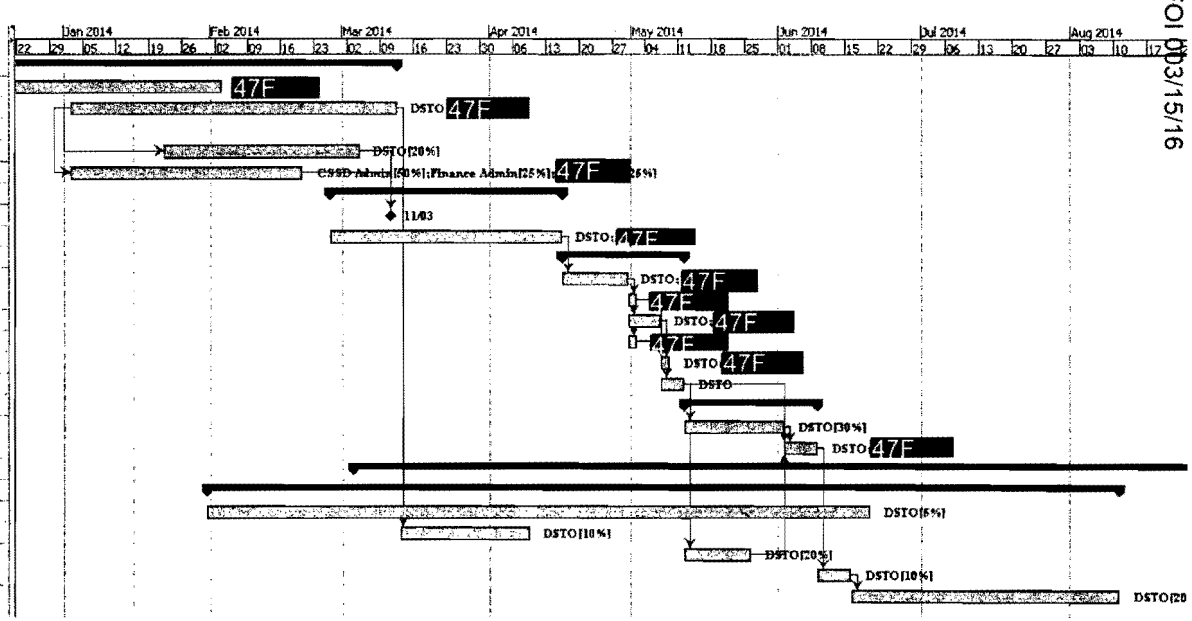

Figure 1 Initial project planning WBS

15. **OPSTSR Schedule Risks**. Schedule risks include:

    a. Supplier delays, availability of DSTO personnel; and

    b. Integration delays induced from deviations from 22 design-baseline.

16. The schedule assumes the availability of the ADF resources as described in this plan.

Customer Point of Contact

17. The customer (requestor) for this OPSTSR is RADM D.L. JOHNSTON, Commander, Border Protection Command who can be contacted on (02) 6275 6191.

18. The customer POC for this OPSTSR is 47F [redacted]

19. **DSTO OPSTSR Manager.** The DSTO manager of this OPSTSR is Dr Brett Haywood, of National Security and ISR Division, who can be contacted on (08) 7389 6053.

20. **Conclusion.** The OPSTSR Request can be supported with some effect on the existing DSTO S&T program.

47F [redacted]

Dr Brett Haywood

Manager, OPSTSR 143
NSID

(08) 7389 6053

20 Jan 2014

Approved for Release (CNSID): Dr Tony Lindsay 47F [redacted] .....

Dated 15 Jan 2014

Endorsed (RLCOPS): Mr Phil James 47F [redacted] ....

Dated 23 Jan 2014

ANNEX B

DSTO OPSTSR PROJECT PLAN – OPSTSR 143 COST SCHEDULE

1. **Cost.** The non-salary cost (including a contingency of approximately 10%) of the OPSTSR is estimated to be:

Timing of Commitment / Nature of Commitment	FY 13/14	mmm 2014	mmm 2014	mmm 2014	mmm 2014	mmm 2014	Total FY 14/15	Total to Jun 14	Recovered from Client?
Local Travel	$40k								50%
Overseas Travel	0								
Contractors	0								
Overtime	0								
Capital	$6k								100%
Comms & IT	$25k								100%
Freight	$2k								0
Consumables	$4k								0
Total Unrecovered	**$77k $26k**								**$51k**

2. **Risk and Payoff Matrix.** Not required because this OPSTSR will make extensive use the radar surveillance capability developed for [redacted] and the lessons learnt from OPSTSRs 125 & 133.

ANNEX C

DSTO OPSTSR PROJECT PLAN – OPSTSR 143
S&T PROGRAM IMPACT SCHEDULE

1. The following table shows the estimated staff time expected to be expended on the OPSTSR:

Staff Time

Name	Division or 'Contractor'	Period Required (Dates)	% of Time for Period Required	Contractor $ or Staff FTE
Brett Haywood	NSID	13/01/14 – 10/08/14	2%	
Andrew Shaw	NSID	01/05/14 – 10/08/14	5%	
David Merrett	NSID	15/01/14 – 10/08/14	40%	
Brendan Hennessy	NSID	01/03/14 – 15/07/14	30%	
Travis Bessel	NSID	01/03/14 – 01/6/14	20%	

22 [redacted]

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